IN THE CLAIMS:

Prior to calculation of the filing fee, please cancel claims 1-5 without prejudice or disclaimer and add new claims 6-26 as follows:

6. (New) A method for forming iteratively a model representative of a permeability field of a heterogeneous medium, discretized by a grid pattern, constrained by a priori geologic data and dynamic data collected in the medium by measurements and observations obtained beforehand, comprising:

a first stage comprising generating an initial model of the permeability in accordance with a Gaussian or related stochastic model, coherent with the a priori geologic data, and carrying out, a simulation of the fluid flows and identifying zones inside the reservoir, calculating effective permeabilities of the identified zones and, from results of the simulation, estimating corrections to be made to the effective permeabilities to improve calibration in relation to the data, and

a second stage comprising propagating the corrections to a whole of grid cells of the permeability field, by means of an iterative optimization process comprising minimizing a function which quantifies a difference between the effective permeabilities required to obtain the calibration and the effective permeabilities calculated for the considered permeability field, using a technique of gradual deformation of realizations of the stochastic model.

7. (New) A method as claimed in claim 1, wherein:

the zones are defined either manually or automatically from the simulation of the fluid flows.

8. (New) A method as claimed in claim 6, wherein:

simulation of the fluid flow is carried out by a streamline simulator and the identified zones of the medium are identified by a set of grid cells traversed by at least one streamline of fixed geometry.

9. (New) A method as claimed in claim 7, wherein:

simulation of the fluid flow is carried out by a streamline simulator and the identified zones of the medium are identified by a set of grid cells traversed by at least one streamline of fixed geometry.

10. (New) A method as claimed in claim 6, wherein:

zones are identified as volume portions on a periphery of wells running through the medium, within a framework of well tests.

11. (New) A method as claimed in claim 7, wherein:

the identified zones are identified as volume portions of a periphery of wells running through the medium, within a framework of well tests.

12. (New) A method as claimed in claim 8, wherein:

the identified zones are identified as volume portions on a periphery of wells running through the medium, within a framework of well tests.

13. (New) A method as claimed in claim 9, wherein:

the identified zones are identified as volume portions on a periphery of wells running through the medium, within a framework of well tests.

14. (New) A method as claimed in claim 6, wherein:

at least one gradual deformation parameter is assigned to each of identified zones.

15. (New) A method as claimed in claim 7, wherein:

at least one gradual deformation parameter is assigned to each of said identified zones.

16. (New) A method as claimed in claim 8, wherein:

at least one gradual deformation parameter is assigned to each of said identified zones.

17. (New) A method as claimed in claim 9, wherein:

at least one gradual deformation parameter is assigned to each of said identified zones.

18. (New) A method as claimed in claim 10, wherein:

at least one gradual deformation parameter is assigned to each of said identified zones.

19. (New) A method as claimed in claim 11, wherein:

at least one gradual deformation parameter is assigned to each of said identified zones.

25. (New) A method as claimed in claim 10, wherein:

the medium is an underground zone.

26. (New) A method as claimed in claim 14, wherein:

the medium is an underground zone.